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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/079,286	02/20/2002	Peter R. Jepson	06160-1P67	6625

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EXAMINER

ZHENG, LOIS L

ART UNIT	PAPER NUMBER
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1742

MAIL DATE	DELIVERY MODE
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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/079,286		JEPSON ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Lois Zheng		1742	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 May 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 26-31 is/are pending in the application.
- 4a) Of the above claim(s) 31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>27 July 2007</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Status of Claims***

1. Claims 1-25 are canceled in view of applicant's amendment filed 25 May 2007.  
New claims 26-31 are added in view of the amendment.

### ***Election/Restrictions***

2. Newly submitted claim 31 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Newly submitted claim 31 and newly submitted claims 26-30 are two distinct inventions that they are capable of separate manufacture, use or sale as claimed and are patentable(novel and unobvious) over each other(though they mach each be unpatentable because of the prior art), MPEP 802.01. See original restriction requirement mailed 1 October 2003.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 31 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 26-30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to

one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In this case, claim 26 recites a refractory metal plate "having a grain size of less than about 40 microns". The original claim 3 recites a refractory metal plating having "an average grain size of less than 40 microns". The original claim 24 recites a sputtering target having a target surface comprising grain size less than about 40 microns. The specification for the instant invention also does not provide support for this claim feature. Therefore, this newly presented claim feature is considered new matter.

Claims 27-30 are also rejected because they depend on rejected claim 26.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 26-30 are rejected under 35 U.S.C. 103(a) as obvious over Turner US 6,331,233 B1(Turner).

Turner teaches a high purity tantalum plate at least 99.95% comprising strong (111) texture with random distribution of (100) texture with mean grain size of less than about 100 microns (Table 1, processes 8-12, claims 1-2). Processes 8-9 and 11-12 as shown in Table 1 of Turner further demonstrate mean grain sizes that are less than the claimed 40 microns. Turner further teaches that the texture of the tantalum plate is uniform throughout the thickness of the plate(abstract, col. 2 lines 34-38).

Regarding claims 26-28 and 30, the tantalum plate as taught by Turner inherently has a thickness, a center and an edge. Since Turner teaches uniform texture throughout the thickness of the tantalum plate, the examiner interprets this to mean that the texture of Turner's tantalum plate is uniform in every direction from the center of the plate based on the broadest reasonable interpretation. Therefore, one of ordinary skill in the art would have expected a constant mixture of grains with {100} and {111} crystallographic orientations in the tantalum plate of Turner and that the distribution of (100) and (111) crystallographic orientations in the tantalum plate of Turner would not vary 30% across the surface of any plane or through out the thickness of the tantalum metal plate as claimed. Furthermore, the purity and the mean grain size ranges as taught by Turner's tantalum plate either read on or overlaps the claimed purity and grain size. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05. The selection of claimed tantalum purity and grain size from the purity and average grain

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size of Turner would have been obvious to one skilled in the art since Turner teach the same utilities in its disclosed purity and average grain size.

Regarding claim 29, since tantalum and niobium are both refractory metals with very similar properties and characteristics and both are widely used as suitable material for sputtering targets, one of ordinary skill in the art would have found it obvious to form the metal plate of Turner using niobium instead with expected success.

8. Claims 26-30 are rejected under 35 U.S.C. 103(a) as obvious over Segal 6,238,494 B1(Segal).

Segal teaches an metallic sputtering target with a minimum grain size different of less than about  $\pm 3\%$  and a dispersion in orientation content ratio of textures of no more than about  $\pm 4\%$ (abstract, claim 1) at any location of the target. The sputtering target has an average grain size of 6 microns(claim 18). Segal also teaches that the sputtering targets can be coupons(col. 5 line 45) and the sputtering targets comprise 99.95% tantalum(col. 5 lines 52-55). Segal also teaches that the sputtering target can also be made of other metals such as niobium (col. 1 lines 61-66).

Regarding claims 26-30, the tantalum or niobium sputtering target as taught by Segal reads on the claimed refractory metal plate comprising a thickness, a center and an edge. In addition, it is examiner's position that the tantalum target of Segal would inherently have a mixture of grains with different crystallographic orientations including the claimed  $\{100\}$  and  $\{111\}$  crystallographic orientations. Since Segal teaches that the dispersion in texture orientation content ratio is no more than about  $\pm 4\%$  at any location of the target, one of ordinary skill in the art would have found it obvious that the

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tantalum or niobium sputtering target of Segal contains a constant mixture of grains with {100} and {111} crystallographic orientation and that the distribution of {100} and {111} textures orientation in the tantalum sputtering target of Segal meets the limitations of varying by less than 30% both across any plane being orthogonal or diagonal to the thickness metal plate and across any thickness of the metal plate.

With respect to claimed purities as recited in claims 26, 28 and 30, Segal teaches that the sputtering target comprises 99.95% tantalum or niobium, which is very close to the claimed purity of 99.99% and 99.999%. Therefore, one of ordinary skill in the art would have found it obvious to use claimed 99.99% or 99.999% tantalum or niobium metal in forming the target of Segal with expected success since 99.95 and 99.99% tantalum are both high purity tantalum having similar properties and behavior under same processing conditions. It is always desirable to use higher purity material to achieve optimum sputtering target.

Furthermore, Segal further teaches that its sputtering target have an average grain size of 6 microns(claim 18), which meets the limitation of the claimed grain size of less than about 40 microns.

### ***Response to Argument***

9. Applicant's arguments filed 25 May 2007 have been fully considered, but are not persuasive.

In the remarks, applicant continues to argue that the uniform texture as taught by Turner is indeed not uniform because the history at the center of the plate is different from the edge as discussed in the instant specification.

However, the examiner does not find applicant's argument persuasive due to lack of evidence data fully commensurate with the scope of the instant invention to demonstrate the alleged non-uniform texture in Turner or the criticality of the claimed invention. The examiner's position on this matter as set forth in previous Non-Final Office Action mailed 25 January 2007 is also incorporated herein.

Applicant further argues that Segal does not teach the claimed {100} and {111} crystallographic orientations.

The examiner does not find applicant's argument persuasive since one of ordinary skill in the art would have found that a tantalum material undergone thermal mechanical working would have at least some grains with {100} and {111} crystallographic orientation as evidenced by Turner and previously presented reference Michaluk et al. US 6,348,113(Michaluk).

Applicant further argues that the claimed purities are significant since it is hard to achieve lower grain size at very high purity levels as claimed.

The examiner does not find applicant's argument persuasive since existing state of the art already appreciate the claimed very high level of purity in tantalum and is able to produce the claimed very high level of tantalum purity as evidenced by Michaluk. Therefore, one of ordinary skill in the art would have found it obvious to have used very high purity tantalum or niobium as claimed to produce the tantalum or niobium sputtering target of Segal in order to achieve optimum quality. One of ordinary skill in the art would have also found it obvious to have substituted the 99.95% tantalum or niobium material with very high purity tantalum or niobium as claimed in making the



sputtering target of Segal with expected success since using a 99.95% tantalum or niobium as taught by Segal and using a very high purity tantalum or niobium as recited by Michaluk or the instant invention produce the same predictable result of forming a sputtering target.

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

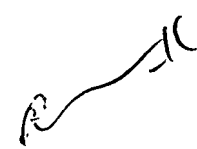
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LLZ



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